Exceptionally, an end of a VOB (Video OBject) has a GOP of 1.2 seconds. Data included between one NV pack and the next NV pack is called VOBU (Video OBject Unit).

Please replace the paragraph at page 2, line 18, with the following rewritten paragraph:

Each NV pack includes 2K-bytes of information used for referring to adjacent NV packs. Each NV pack also includes the data size of the first reference picture in a GOP. The information used for referring to adjacent NV packs is composed of relative addresses of NV packs of VOBUs in the forward and backward directions separated by a predetermined time period from the current VOBU, the relative addresses being obtained based on the start time code of the current VOBU. The predetermined time period may be one to 15, 20, 60, 120, and 240 seconds.

Please replace the paragraph at page 4, line 20, with the following rewritten paragraph:

The above object is achieved by an optical disc including a data area and a time map area, the data area storing one or more video objects and the time map area storing time map information, where each video object includes a plurality of video object units. The time map information includes a first time table and a second time table, i.e., a pair of time tables, for each video object. Each first time table includes: addresses of video object units in a corresponding video object, the addresses being arranged in order and indicating storage positions of the video object units that correspond to reproduction points that differ by a predetermined time unit, the predetermined time unit being longer than a maximum reproduction period of a video object unit; and indicators for specifying the video object units which respectively correspond to the addresses. Each second time table includes an entry for each video object unit in the corresponding video object, the entries being arranged in order and each including a reproduction period of a video object unit and a data size of the video object unit.

Please replace the paragraph at page 5, line 14, with the following rewritten paragraph:

With the above construction, the first time table has a small size since the first time table only records storage positions of video object units at predetermined intervals. For the second time table, it is not required to record a storage position of each video object unit in relation with a reproduction

point. The second time table also includes a reproduction period and a data size for each video object unit. As a result, the second time table also has a small size since the reproduction period is smaller than the data size. It is very easy to generate the second time table while data is recorded onto the disc since the second time table is recorded in units of video object units which are the unit of encoding.

Please replace the paragraph at page 6, line 1, with the following rewritten paragraph:

In the above optical disc, each first time table may include a plurality of first time maps which each correspond to a different one of the reproduction points, and each second time table may include a plurality of second time maps which each correspond to a different one of the plurality of video object units. Each first time map includes: one of the indicators, the indicator indicating a second time map for a video object unit that corresponds to the reproduction point, an address of the video object unit that corresponds to the reproduction point, and difference information indicating a difference between the corresponding reproduction point and a reproduction start time of the corresponding video object unit. Each second time map includes time information indicating a reproduction period of a corresponding video object unit, and also includes a data size of the corresponding video object unit.

Please replace the paragraph at page 6, line 25, with the following rewritten paragraph:

The above object is also achieved by a recording apparatus including: an input unit for receiving video data in a time series; a compression unit for compressing the received video data to generate a video object which includes a sequence of video object units; a write unit for writing data onto an optical disc; and a control unit for controlling the write unit, where the control unit controls the write unit to write the generated video object onto the optical disc, generates a first time table and a second time table, and controls the write unit to write the generated first time table and second time table. Each first time table includes: addresses of video object units in a corresponding video object, the addresses being arranged in order and indicating storage positions of the video object units that correspond to reproduction points that differ by a predetermined time unit, the predetermined time

unit being longer than a maximum reproduction period of a video object unit; and indicators for specifying the video object units which respectively correspond to the addresses. Each second time table includes an entry for each video object unit in the corresponding video object, the entries being arranged in order and each including a reproduction period of a video object unit and a data size of the video object unit.

Please replace the paragraph at page 7, line 22, with the following rewritten paragraph:

With the above construction, the first time table has a small size since the first time table only records storage positions of video object units at predetermined intervals. For the second time table, it is not required to record a storage position of each video object unit in relation with a reproduction point. The second time table also includes a reproduction period and a data size for each video object unit. As a result, the second time table also has a small size since the reproduction period is smaller than the data size. It is very easy to generate the second time table while data is recorded onto the disc since the second time table is recorded in units of video object units which are the unit of encoding.

Please replace the paragraph at page 8, line 9, with the following rewritten paragraph:

In the above recording apparatus, each first time table may include a plurality of first time maps which each correspond to a different one of the reproduction points, and each second time table may include a plurality of second time maps which each correspond to a different one of the plurality of video object units. Each first time map includes: one of the indicators, the indicator indicating a second time map for a video object unit that corresponds to the reproduction point, an address of the video object unit that corresponds to the reproduction point, and difference information indicating a difference between the corresponding reproduction point and a reproduction start time of the corresponding video object unit. Each second time map includes time information indicating a reproduction period of a corresponding video object unit, and also includes a data size of the corresponding video object unit.

Please replace the paragraph at page 17, line 6, with the following rewritten paragraph:

In this way, sectors which are not used for data recording exist at the boundaries between zone areas. Therefore, on a DVD-RAM, logical sector numbers (LSN: Logical Sector Number) are assigned to physical sectors of the user area in order starting from the inner periphery to consecutively show only the sectors used for recording data.

Please replace the paragraph at page 18, line 18, with the following rewritten paragraph:

FIG. 5 shows a sector management table (space bit map) and a consecutive recording area management table. The sector management table is recorded in the partition area of the volume area and is included in the file system management information. The consecutive recording area management table is used to manage the consecutive recording areas. The drawing also shows a hierarchical relation between the volume area, sectors, and contents of the sectors.

Please replace the paragraph at page 23, line 8, with the following rewritten paragraph:

The plurality of pieces of PGC information 831, 832, ... are each a table which includes a list of video sections in VOBs, the sections being arranged in the reproduction order. The information specifying the video section are called cells. Each cell specifies a video section in a VOB by its start time and end time. Each piece of PGC information shows logically linked video sections of AV data specified by the cells.

Please replace the paragraph at page 23, line 15, with the following rewritten paragraph:

Each of the cells 831a, 831b, ... includes an AV file identifier, a VOB identifier, and a start time and end time of a video section.

Please replace the paragraph at page 26, line 21, with the following rewritten paragraph:

The VOBU reference time 8232b is a period for which a VOBU is reproduced. The time 8232b is represented with one byte. The time 8232b is used for detecting a target image in the performances of special reproductions and reproductions at specified times. That is to say, the reproduction apparatus continues to add each VOBU reproduction time to the VOBU start time in sequential order until the addition result matches the time of the VOBU corresponding to the target, image. The reproduction apparatus detects the target VOBU and then further detects the target image from the detected VOBU.

Please replace the paragraph at page 27, line 18, with the following rewritten paragraph:

The system includes an optical disc recording/reproduction apparatus 10 (also referred to as DVD recorder 10), a remote controller 6 used for operating the DVD recorder 10, a DVD recorder display 12 connected to the DVD recorder 10, and an antenna 11.

Please replace the paragraph at page 27, line 23, with the following rewritten paragraph:

After the DVD-RAM disc is loaded, the DVD recorder 10 compresses the video/audio data which is included in the analog broadcasting waves which is received through the antenna 11, records the compressed data as AV files into the DVD-RAM disc, expands the compressed video/audio data, and outputs the expanded video/audio signals onto a display 12.

Please replace the paragraph at page 28, line 13, with the following rewritten paragraph:

The control unit 1 includes a CPU 1a, a processor bus 1b, a bus interface 1c, and a main memory 1d. The control unit 1 executes a program stored in the main memory 1d to control the entire DVD recorder 10 in terms of recording, reproducing, editing, etc. Especially, after an AV file

(VOB) including AV data is recorded, the control unit 1 generates VOB information and PGC information corresponding to the recorded VOB, and records or updates the AV data management file. Also, when the AV data is reproduced, the control unit 1 obtains, based on the VOB information, the address of a section specified by its start and end times in a cell included in the PGC information in the AV data management file shown in FIG.9. The control unit then reads out and reproduces the section. Especially, in case of special reproductions, the control unit 1 refers to the VOB information to sequentially obtain addresses of reference pictures which are arranged at intervals of a predetermined period (e.g., 5 seconds or -5 seconds), for fast forwarding or rewinding.

Please replace the paragraph at page 29, line 6, with the following rewritten paragraph:

The MPEG encoder 2 compresses the video/audio data which is included in the analog broadcasting waves received through the antenna 11 and generates an MPEG stream.

Please replace the paragraph at page 32, line 16, with the following rewritten paragraph:

The disc reading unit 101, on receiving a logical sector number and the number of sectors from the file system unit 102, reads data from the specified sectors and transfers the read data to the file system unit. However, in reality, the disc reading unit 101 reads data in units of ECC blocks. After the read data is subjected to the ECC process, the disc reading unit 101 transfers only necessary data in sectors to the file system unit. This is because by reading AV data in units of ECC blocks (each block composed of 16 sectors), overhead is reduced. This is the same with the disc recording unit 100.

Please replace the paragraph at page 33, line 18, with the following rewritten paragraph:

The user IF unit 106 receives instructions for operations from the user via the remote controller 6, and sends the received user instructions to the recording/ editing/ reproducing control unit 105.

Please replace the paragraph at page 33, line 22, with the following rewritten paragraph:

The control data management unit 107 reads the AV data management file which is non-AV data from the main memory 1d, and provides information on request from any unit.

Please replace the paragraph at page 37, line 2, with the following rewritten paragraph:

The AV data recording unit 110, AV data editing unit 120, and AV data reproducing unit 130 achieve processes such as recording, editing, and reproducing by using combinations of the above commands.

Please replace the paragraph at page 39, line 19, with the following rewritten paragraph:

The recording/ editing/ reproducing control unit 105 sends a file identifier and a parameter indicating the "time-ensuring" quality specified as the recording condition to the AV data input unit 111. The AV data input unit 111 instructs the MPEG encoder 2 to start encoding the video and audio data of a predetermined channel received through the antenna 11 and to start transferring the encoded MPEG data to the track buffer 3a (step 221) .

Please replace the paragraph at page 41, line 19, with the following rewritten paragraph:

On receiving the stop instruction (step 224), the AV data input unit 111 issues the WRITE command (step 230). The AV data input unit 111 then issues the CLOSE command (step 231). The AV data input unit 111 further informs the AV file management information generating unit 112 that a recording of an AV file (VOB) has ended (step 232) to end the entire process. Note that the WRITE command is issued in step 230 to record onto the disc the rest of the data in the track buffer. Also, the CLOSE command issued in step 231 is a command used to write back the Fd from the work memory onto the DVD-RAM disc as a file identifier, a file entry or the like on the DVD-RAM disc.

Please replace the paragraph at page 43, line 5, with the following rewritten paragraph:

When a file management table has already been held in the control data management unit 107, the AV file management information generating unit 112 assigns a not-assigned VOB identifier (e.g., the next VOB identifier). When a file management table has not been held in the control data management unit 107, the AV file management information generating unit112 assigns VOB #1 as the VOB identifier, obtains the reproduction time of the AV file from the AV data input unit 111, and generates the VOB general information which includes these kinds of information.

Please replace the paragraph at page 52, line 7, with the following rewritten paragraph:

As described above, reference picture addresses corresponding to times which differ by the skip time are sequentially obtained in accordance with the time map information. Furthermore, the time map information includes the time map table and the VOBU table in a hierarchical structure in which the reproduction times of all the VOBUs and their storage positions (sector addresses) are related to each other. With this construction, it is unnecessary for the disc to record the reproduction times and storage positions (sector addresses) of all the VOBUs. This reduces the amount of data to be recorded in one disc, enabling video/audio data to be reproduced in realtime while the video/audio data is recorded onto the disc.

IN THE ABSTRACT:

Please replace the paragraph at page 60, line 1, with the following rewritten paragraph:

An optical disc including: a data area storing one or more video objects; and a time map area storing time map information. Each video object includes a plurality of video object units. The time map information includes a first time table and a second time table for each video object. Each first time table includes: addresses of video object units in a corresponding video object; and indicators. The addresses are arranged in order and indicate storage positions of the video object units that correspond to reproduction points that differ by a predetermined time unit. The predetermined time unit is longer than a maximum reproduction period of a video object unit. The indicators specify the video object units which respectively correspond to the addresses. Each second time table includes